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# The Impact of Food Price Crisis on Government Debt in the Arab Region

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**Abstract**

This study explores the Impact of Food Prices Crisis on budget deficits in the Arab region. Panel data is used for the period of 2000 to 2012 in sixteen countries in the region. We rum multi regression models are used to estimate the Impact of food crisis on government debt in high, middle and low income countries before and after the food crisis period in 2006. The analysis reveals that the changes in food prices have a negative and significant impact only on the low and middle income countries' government debt before the crisis. We also found that the slow growth in GDP after the global economic and food crisis period, political instability, lagged deficits, real interest rates, and unemployment were also important determinants of government debt in most of the models estimated.

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**Keywords:** Food Crisis, Government Debts, Arab region, Social and Economic development, Poverty.

## 1. Introduction

Arab countries are facing many challenges and difficulties on the economic and political level, especially the Arab Spring countries, there is a great uncertainty about the outcome of this movement, at least so far till now the Arab revolutions that happened recently by the end of year 2011which were started by Tunisia, followed by Egypt, Libya, Yemen, and Syria did not achieve any positive results or any social development. There is a

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new crisis now looming on the horizon in the region and is affecting all the Arab countries and not only the Arab Spring countries, the food price crisis , the continuing increase in the global food prices cause a lack in food security even in wealthier countries( GCC oil exporting countries). The crisis has several accepted causes, according to IMF 2008 World Economic Outlook, global food prices have worsened in 2008 as a result of the movement of investment and hedge funds in to commodity markets in order to compensate for their losses in the property markets, moreover speculation in global food market also contributed to the crisis. The diversion of production from food crops to the production of biofuels, and the world increase in oil prices which increases transportation costs. Other factors emerged recently and contributed a lot to the crisis, the rising living standards in many developing nations such as China, and India, which cause an increase in the world demand for livestock and feedstock. It is expected that such crisis is going to be much worse in the future because of the increasing global desertification, global conflicts on water resources, and the continuing rise in energy prices. Arab States are the most food-importing countries due to shortage of food production and the neglect of the agricultural sector for long periods of time, and food subsidies. The increasing cost of food imports led to an increase in domestic food prices and unprecedented increase in inflation rates.

This global food crisis also has many social, economic, and developmental consequences; this study tries to assess the impact of the crisis on governments' budgets deficit. The adverse shocks of slow growth and high unemployment were aggravated in the region after 2008 by the rise in world real interest rates which raised most governments' costs of debt servicing. This rise in Arab governments' budget deficit was particularly large, of course in Arab spring countries such as Egypt, Tunisia, Yemen, and Syria, that had already accumulated a large stock of debt. It would be useful at this point to quantify the effects of the food crisis on budget deficits of the Arab governments.

We run multi panel regression models for the low and middle income oil and non oil exporting countries, for the high oil exporting countries, and pooled panel regressions for the 16 Arab nations before and after the food crisis. To our knowledge this is the first empirical study which tries to estimate the impact of rising food prices on budget deficits in general and in the Arab nations in particular, the contribution of this paper lies mainly on assessing the impact of food crisis on budget deficit as, there is a lack of empirical studies on causes and consequences of food crisis especially in Arab nations. The paper aims to achieve the following objectives: 1)To show the size of the food crisis, its Causes and consequences in the selected Arab nations. 2)To estimate the impact of food crisis, and other factors on Arab government debts.

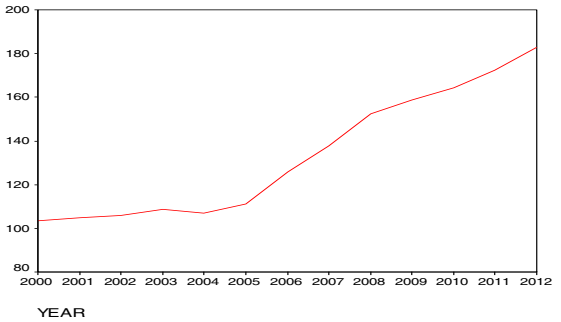
The paper proceeds as follows: Section 2 introduces the crisis, its size, causes and consequences in the selected Arab nations, section 3 gives an overview about the budget deficit in the selected Arab governments, and its causes; section 4 deals with the estimation of the regression equations; and section 5 gives the empirical results, and finally section 6 provides the conclusions of the study.

## 2. The Nature of Food Price Crisis in the Arab Region, Causes and Consequences:

There has been a great debate of what happened and why on world food markets between 2006 and 2008, and more recently in 2011, and 2012 (The OECD-FAO Agricultural Outlook), the degree to which global prices in terms of both levels and movements are transmitted to domestic prices is a critical issue. The world witnessed large increases in the prices of wheat, rice, and maize on international markets during the food crisis of 2006-2008, the increase in international food prices led to substantial increase in domestic prices in most countries, except large countries that were able to achieve self-sufficiency, but such trade insulation increased prices and volatility in international markets, making small import-dependent countries especially in Africa deeply affected by the economic and food crisis ( FAO,2011: P.21). Figure 1 shows that the mean value of the FAO domestic Food Price Index for the selected countries in Arab region was relatively low from 2000 to 2005.

During that time, the index varied between 103.5 points in year 2000 and 111.2 points in year 2005. It began to rise gradually in year 2006, reaching 125.9 points. The index subsequently plunged to 158.6 points in year 2009, and continued to increase till reached 182.8 points in year 2012.

Figure 1: Food Price Index for the selected countries in the Region (2000-2012)



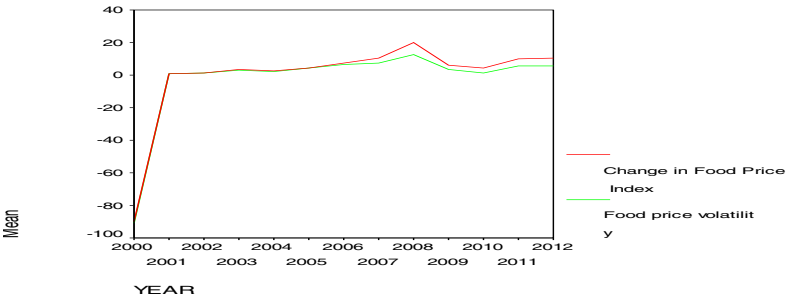

Source: Figure prepared by the author using data obtained from FAO, "FAO domestic Food Price Index", Food Security Statistics.

Figure 2 also shows the more pronounced fluctuations in food prices beginning in year 2006; these fluctuations are due to the growing volatility in food prices experienced from 2006 to 2012. Food price volatility contributes to uncertainty, and economic risk to farmers and consumers (FAO, 2011).This paper will use the food price index as a trend for the continuing increase in food prices, we also use the percentage change in the food price index, and food price volatility (FAO measures price volatility as the coefficient of variation, which is the standard deviation of prices ) as three measures for the food price crisis, so food price crisis is defined in the paper as the increase in domestic food prices, and their fluctuations all over the studied period(One important distinction is that between average prices over time and variability of prices over time, as average prices may change without any change in variability, and vice versa).

The nature of the food crisis differs between the countries in the region, more specifically between the oil and non oil exporting countries, but they are all contended with the global food crisis. The nature of the crisis can be characterized as a supply-and- demand imbalance due to a production crisis. From the supply side , agriculture in the region suffers from low productivity due to the prevailing climatic conditions, rainfall in the region is characterized by erratic seasonal distribution with the limited availability of water resources caused several drought episodes of varied nature, impacts and severity( FAO,1999) . On the consumption side, the demand for food increases because of rapid population growth, and any further growth in biofuels (depending on biofuels polices and the price of oil), faster than the increase in domestic food production. Countries that import a large share of the food they consume, and with a high percentage of food imports from their total merchandise exports are hurt the most by high prices and suffer from high domestic food price volatility such as Yemen and Egypt. The terms of trade effects will differ among the selected countries in the region, for example oil exporting countries may not be affected by the increase in international food prices as the low and middle income countries if the price of their exports increases by more than the price of food imports (Food and Agriculture Organization ,2011:P.14). Most of gulf countries, such as Qatar, and Bahrain suffer from a sharp decrease in food production due to severely limited water resources, but they generate sufficient export revenues to pay for their food imports.

The continuing high food prices and their volatility have many macroeconomic, social, and political impacts especially in poor and small importing countries. The increasing food prices may have political impacts, and cause political instability, deterioration of democratic institutions, and a significant increase in anti-government demonstration (Arezki, and Bruckners, 2011).

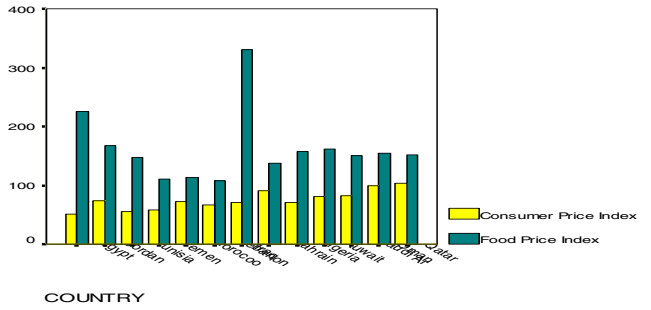
Figure 2: Percentage Change in the FAO Domestic Food Price Index, and the Domestic Food Price Volatility for the Selected Countries in the Region (2000-2012)




Source: the percentage change in the food price index is estimated by the author using data obtained from FAO, the food price volatility was obtained from the FAO food price volatility.

The continuing increase in international food prices has many economic and social impacts, it causes an increase in domestic price levels and an increase in inflation rate (Bakucs, Falkowski,and Ferto ,2013). Figure 3 indicates that in 2010 the annual percent change in food inflation in several Arab countries drove and outpaced the change in overall inflation. The food crisis also affects children nutrition; the percentage of children aged less than 5 years underweight in total children less than 5 years population for example reached 43.1% in year 2003 ( FAO Food Security Statistics). The crisis may also increase women's participation in the labor force increasing work load stress on the time they have available to engage in child care and household work child care (Bhalotra and Umana, 2009). The effects on balance of payments and the exchange rate will differ among countries, it will be stronger for countries for which food trade is a substantial share of total merchandise trade, food exporting countries will benefit the most when food prices are high, but small food importing countries will hurt the most by high prices. For small food importing countries, the cost of higher prices will have a direct fiscal impact, if food subsidies increase to offset the higher prices. Higher levels of subsidies can increase government debts, and reduce funds available for investment in public goods such as health, education, and infrastructure thus reducing long term economic growth and sustainable development ( For more details see FAO, 2011) .

Figure 3: The Food CPI drove the overall CPI in Selected Countries in 2010.

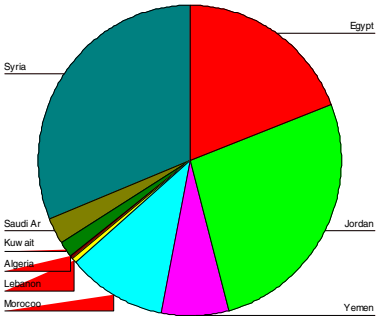



Source: World Bank Database

## 3. Arab Governments Debts: Overview and Causes

Macroeconomists are increasingly recognizing the need to explore carefully what governments actually do, rather than what they ought to do. Our paper focuses on a specific and important area of macroeconomic policymaking: the management of public debt. Giving the large deficits in many Arab economies especially the Arab spring nations, and the resulting sharp rise in fiscal deficits, it is important to determine the impact of food crisis, and other economic and political factors leading to such large deficits. The small food importing countries in the region face increasingly fiscal pressures due to the food crisis which not only caused inflation, but also sever fiscal deficits in Arab governments due to the increase in wages in the public sector, and the increase in food subsidies especially Subsidies made on bread figure 4 shows that in some Arab nations such as in Egypt, Syria, and Jordan, food subsidies have high share of GDP. The governments also implemented direct cash transfers, and reduced tariffs on basic imported food commodities to support the poor.

Figure 4: Food Subsidies are a High Share of GDP in 2007




Source: World Bank database

Figure 5 panel (a) shows that in 2012 the annual percent change in government debt to GDP increase in some poor oil and non oil exporting, while the percentage change in government debt to GDP decreased in all major oil exporting countries in the region in 2012 except in Oman and Qatar due to the rising revenue from oil exports as shown in figure 5 panel (b).

Other possible determinants of government debts in the region include: Slow growth and high unemployment were aggravated after the global economic crisis 2008 by the rise in world real interest rates which unexpectedly raised most Arab governments' costs of debt servicing. As with the growth slowdown and the increase in unemployment, the effects of higher interest rates on budget deficits will be much stronger and persistent. There is also evidence that political instability contributes to higher share of domestic public debt to GDP (Borensztein et al., 2004), we aim to show that political instability especially in the low and middle income countries especially the Arab spring countries can explain the evolution of budget deficits when added to the list of variables explained in the next section.

## 4. The Model and Panel data Analysis:

We choose Panel data framework to control for heterogeneity between countries and colinearity between variables to get more reliable parameter estimates. We also use Difference-to- Difference estimation to correct for the autocorrelation problem by getting rid of time-invariant country effects. The basic structure of the multi and pooled regression model is the following:

$$D(bit)= a0 + a1\ d\ (bi,t-1) + a2d(Uit) + a3d(Yit) + a4d(Psit) + a5d(Rit) + a6\ (FCit) + \mu it$$

Figure 5: Percentage Change in Arab Governments Debt to GDP in 2012
Panel (a):

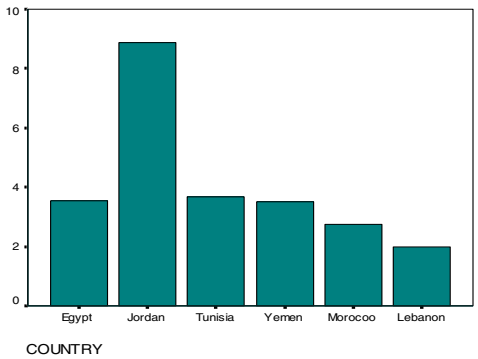
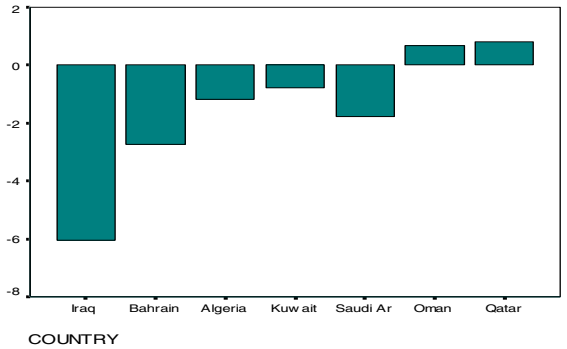



Figure 5: Percentage Change in Arab Governments Debt to GDP in 2012
Panel (b):




Source: World Bank Database.

Where the left hand side variable is the annual deficit, measured as the change in the debt-GDP ratio d(bit). The explanatory variables are (For the variables selected, we applied a similar model used in (Roubini,N. and Sachs,J.D. 1989,P.921).

1- The lagged deficit d(bi,t-1).
2- The change in the unemployment rate, d (Uit).
3- Food Crisis measured as food price index, the change in the Food Price index, and domestic food price volatility.
4- The change in political stability, d(Psit).
5- The Change in real interest rate, d( Rit).
6- The Change in GDP Growth rate, d(Yit).
7- An error term, μit.

Where (i denotes country, t denotes time, and d(x) denotes the change in variable x), we run two separate regression models for two groups of the Arab countries under the study:

**Group 1**: High income oil exporting countries (Iraq, Algeria, Bahrain, Oman, Kuwait, Saudi Arabia, and Qatar). **Group 2**: Middle and low income oil and non oil exporting countries ;( Yemen, Syria, Tunisia, Jordan, Egypt, Lebanon, Morocco, Sudan, and Occupied Palestine Terrorism).

According to our expectations which are based on our discussion, we expect that the deficit should be a positive function, with a coefficient less than 1, of the lagged deficit; a positive function of the change in the unemployment rate; a positive function of the food crisis; a negative function with the change in political stability; a positive function with the change in real interest rate, and a negative function with the change in GDP growth rate. We also expect to have a much stronger and significant impact of the food crisis on budget deficits in low and middle income countries in the region. Table 1 shows the variables, their measurements and sources of data.

Table1: Variables, Measurements, and Sources of Data

| Variables | Measurements | Sources of Data |
|---|---|---|
| d(bi,t-1) | The Lagged deficit | World bank database |
| d(Uit) | The Change in Unemployment rate | World bank database |
| FC | Food Price Index<br>Change in Food Price Index<br>Domestic Food Price Volatility | FAO Organization Database |
| d(Pit) | Change in the percentage of political stability | Worldwide Governance Indicators( World Bank) |
| d(Rit) | Change in real Interest rate measured as the change in the debt servicing ratio | World Bank database |
| d(Yit) | Change in GDP growth Rate | World Bank database |

**5. Empirical Results:**

We run multi panel regressions for the low and middle income oil and non oil exporting countries, and for the high oil exporting countries, and for the whole sample. For each estimated regression, we run three models, one before the crisis (2000-05), one after the crisis (2006-12), and one pooled, as shown in tables (2,3, and 4). The results shown in table 2 suggest that the lagged deficit enters with a coefficient ranges from 11% to 67%, the coefficients are all positive, and are highly significant for the whole period and bigger after 2006 suggesting that about 67% of the lagged budget deficit persists to the next period, this result was expected because of the implications of the world economic and food crisis that started since 2006. A rise in unemployment (denoted by dUit) raises the budget deficit, as worsening of the unemployment rate reduced public revenues and increased public revenues and increased public expenditures. A rise in the debt-servicing cost (denoted by dRit) raises the budget deficit; an acceleration of GDP growth (denoted by dYit) lowers the budget deficit, all signs are negative ad significant at 10% except after 2006 the impact of the change in GDP growth rate is negative but not significant this might be explained by the deceleration of GDP growth that happened after 2006 because of the global economic and food crisis and the adverse growth shock that happened in the Arab Spring countries after 2011.

We also find a negative and highly significance impact of political stability on public deficit except after 2006 the impact of political stability on budget deficit is negative but insignificant this may be due to the increase in political instability in the Arab spring nations after 2011. Our surprising result of the estimation is the negative correlation of the change in food prices, the food price index and the food price volatility with

budget deficits, the change in food prices only has a significant impact on governments debts before the food prices crisis that began in the early of 2006, this result shows that these countries benefited from higher prices as the majority of the poor in these countries are net food sellers.

Table 2: Regression Results for the Whole Sample

| Variables | Coefficients | | |
|---|---|---|---|
| | 2000-2005 | 2006-2012 | Pooled (2000-12) |
| d(bi,t-1) | 0.114<br>(1.304) | 0.666***<br>(9.705) | 0.195***<br>(3.192) |
| d(Uit) | 1.87**<br>( 2.042) | 0.034<br>( 0.527) | 0.126**<br>( 2.068) |
| d(FPI) | -0.502***<br>(-5.033) | -0.006)<br>(-0.086) | -0.408***<br>(-6.057) |
| FPI | -0.032<br>(-0.359) | -0.079<br>(-1.093) | -0.015<br>(0.242) |
| FPIV | -0.063<br>(-0.713) | -0.041<br>(-1.093) | -0.017<br>(-0.290) |
| d(Pit) | -0.460***<br>(-4.641) | -0.015<br>(-0.226) | -0.364***<br>(-5.578) |
| d(Rit) | 0.185**<br>(2.103) | 0.383***<br>(5.228) | 0.215***<br>(3.600) |
| d(Yit) | -0.156*<br>(-1.791) | -0.036<br>(-0.493) | - 0.154*<br>(-2.601) |
| R-Square | 0.302 | 0.534 | 0.260 |
| F Statistics | 5.041*** | 17.933*** | 9.352*** |
| No of Observations | 101 | 118 | 221 |

*** denote significance at 1%, ** denote significance at 5%, and * denote significance at 10%. t- Statistics in parentheses.

Volatile prices might actually benefit some countries, as the increase in food prices will increase the governments' revenue from food exports causing a decrease in budget deficits. This result also may be due to the food polices applied by these countries , the smaller food importing countries reduced their food imports after the global food crisis, while the high income countries applied different food security programs as what happened in Qatar in 2012. Table 3 shows that the variable measuring the slowdown in growth is significant; its magnitude suggests that each 1% point slowdown in GDP growth after 2006 raises the budget deficit relative to GDP by 0.298% points. The results also suggest that debt-servicing cost is the highly significant factor affecting budget deficit after 2006, the lagged deficit enters with a coefficient of about0.34, suggesting that about 0.34 % of the lagged deficit persists after 2006. We also find a negative and highly significant impact of the change in food price index on budget deficit before the food price crisis, as most of these countries (excluding Yemen) were able to apply some reforms caused food productivity to improve, and to reduce their food imports.

After the food crisis in 2006, we couldn't find such impact because of the increase in food subsidies paid by

the governments. Political stability has a negative and significant impact on budget deficits in the period (2000-2005), after 2006 most of these countries suffered from the deceleration in political stability especially in 2011, because of the Arab spring revolutions.

Table 3: Regression Results for the Low and Middle Income Countries

| Variables | Coefficients 2000-2005 | 2006-2012 | Pooled (2000-12) |
|---|---|---|---|
| d(bi,t-1) | 0.084 | 0.335** | 0.083 |
| | (0.795) | (2.754) | (1.076) |
| d(Uit) | 0.061 | 0.024 | 0.029 |
| | (0.566) | (0.204) | (0.376) |
| d(FPI) | -0.785*** | -0.148 | -0.659*** |
| | (-6.085) | (-1.085) | (-7.250) |
| FPI | 0.003 | 0.140 | 0.072 |
| | (0.977) | (1.063) | (0.931) |
| FPIV | 0.083 | 0.009 | 0.072 |
| | (0.738) | (0.073) | (0.931) |
| d(Pit) | -0.688*** | 0.014 | -0.518*** |
| | (-5.199) | (0.116) | (-5.879) |
| d(Rit) | 0.107 | 0.438*** | 0.106 |
| | (0.911) | (3.688) | (1.340) |
| d(Yit) | -0.053 | -0.298** | -0.008 |
| | (-0.492) | (-2.648) | (0.106) |
| R-Square | 0.504 | 0.349 | 0.381 |
| F Statistics | 5.726*** | 3.613*** | 8.308*** |
| No of Observations | 53 | 62 | 116 |

*** denote significance at 1%, ** denote significance at 5%, and * denote significance at 10%. t- Statistics in parentheses.

Table 4 shows that the acceleration in GDP growth rate had a negative and significant impact on government debt before 2006, a 1% point increase in GDP growth rate reduced budget deficit by almost 0.308 points relative to GDP in the high income countries in the region (oil exporting countries). The results also suggest that an increase in debt servicing cost by 1% point caused an increase in budget deficit by 0.343 points. Note that the variables measuring the cost of debt servicing, and the lagged deficit are the only highly significant factors explaining budget deficits after 2006 in these countries. Political stability also played a significant impact on reducing budget deficit for the whole period. All variables measuring food crisis have negative and insignificant impact on budget deficits, as most of these countries are net food importers and their food imports are covered by their oil exports, also most of these countries had applied food security programs as the Qatari program which was supposed to present formally its recommendations in 2012.

## 6. Conclusion:

Our conclusion may be surprising for the low and middle income countries, we have found that the increase in food price index decreases budget deficit in these countries before the food crisis that began in 2006, as most these countries are net food exporters, but during the period (2006-2012) in which food prices were aggravated, we couldn't find such significant impact , this result may be due to the increase in government expenditure on food subsidies, wages, and transfer payments to reduce poverty especially after 2011, as revolutions call for reducing poverty, liberty, and achieving better social justice. The estimated equations for the highly income countries in the region show insignificant impact of food crisis on budget deficits before and after the food crisis period, this results may be due to that most of these countries are net food importers, but their food imports are covered by the revenue obtained from their oil exports. On the other side most of the oil exporting countries applied different food security programs after the food crisis. We also have found

that the slow growth in GDP after the global economic and Food crisis period played an important role in explaining the increase in budget deficits in the low and middle income countries. The resulted significant budget deficits and the sharply rising ratios of debt to GDP in these countries were greatly exacerbated by the sharp rise in real interest rates after 2006. Political stability, lagged deficits, and unemployment were also important determinants of government debts in most of the models estimated.

Table 4: Regression Results for the High income countries

| Variables | Coefficients | | |
|---|---|---|---|
| | 2000-2005 | 2006-2012 | Pooled (2000-12) |
| d(bi,t-1) | 0.133 | 0.772*** | 0.417*** |
| | (0.904) | (8.689) | (4.583) |
| d(Uit) | 0.026 | 0.084 | 0.035 |
| | (0.159) | (1.059) | (0.367) |
| d(FPI) | -0.101 | -0.041 | -0.064 |
| | (-0.565) | (-0.427) | (-0.616) |
| FPI | -0.238 | -0.079 | -0.057 |
| | (-1.612) | (-0.703) | (-0.583) |
| FPIV | 0.044 | -0.016 | -0.018 |
| | (0.304) | (-0.161) | (-0.209) |
| d(Pit) | -0.189 | -0.005 | -0.230** |
| | (-1.152) | (-0.060) | (-2.439) |
| d(Rit) | 0.343** | 0.488*** | 0.363*** |
| | (2.322) | (4.668) | ( 4.319) |
| d(Yit) | -0.308** | -0.134 | -0.286*** |
| | (-2.302) | (-1.254) | (-3.476) |
| R-Square | 0.328 | 0.726 | 0.313 |
| F Statistics | 2.378** | 15.545*** | 6.859*** |
| No of Observations | 47 | 55 | 103 |

*** denote significance at 1%, ** denote significance at 5%, and * denote significance at 10%. t- Statistics in parentheses.

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